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UNIPARSE: a universal parser

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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

UNIPARSE: A UNIVERSAL PARSER

by

Robert Patrick Gililland

Thesis Advisor: B. A. Gold

December 1973

Thesis
G435

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UNIPARSE: A Universal Parser

by

Robert Patrick Gililland
Lieutenant, United States Navy
B.S., University of North Carolina, 1967

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN COMPUTER SCIENCE

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ABSTRACT

UNIPARSE: A Universal Parser, is a FORTRAN program implemented on an IBM 360/67. It is capable of parsing any finite, recursively enumerable language. The system simulates a Universal Turing Machine and utilizes bounded Breadth-First search and development techniques to evaluate Type 0 languages.

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I. INTRODUCTION

The objective of this paper is to present a generalized method for parsing finite, recursively enumerable languages. The system developed to implement this method, UNIPARSE, will parse any language of the above type given the grammar for that language in canonical form.

The motivations for attempting to develop such a system were twofold. First, parsing algorithms for all languages are dependent upon the syntactical constructs of the language. Since recursively enumerable languages represent one of the largest classes of languages, the development of a system capable of parsing languages belonging to this class provides for the development and implementation of computer languages of a less restrictive nature than those in existence today.

Second, although there do exist generalized methods for parsing computer languages of certain types (Simple Precedence and SLR languages, for example), there is no existing system which can parse all computer languages. UNIPARSE provides such a mechanism.

The system was designed for use in a batch processing environment but could easily be modified for an interactive system. A Users Manual (Appendix A) and a documented program of the system (Appendix B) are provided as a part of the presentation. Appendix C contains examples of the parsing of languages by the system.

II. SYSTEM DESCRIPTION

UNIPARSE is a simulation of a nondeterministic Universal Turing Machine. The system, given the grammar for a recursively enumerable language, will construct a Turing Machine capable of recognizing words from the language. Furthermore, if a string of symbols is input to the system, UNIPARSE simulates the operation of the constructed Turing Machine and determines whether or not the input string is a member of the language.

The system can conceptually be divided into two major subsystems. The first of these, titled CONVERT, when given a language grammar constructs a Turing Machine capable of recognizing members of the language. The second subsystem, called PARSER, takes as inputs the Turing Machine constructed by the first subsystem and a string of symbols. It then proceeds to simulate the operation of the Turing Machine, and, by doing so, parses the input string. Both subsystems are described in detail in the following sections. The first subsystem discussed is CONVERT.

A. CONVERT

This portion of the system converts the set of productions for a grammar into a Turing Machine which recognizes the language generated by the grammar. The following items are inputs to this subsystem:

1. The set of productions which define the language grammar. These productions are input in the following format:

   (Left Part) : (Right Part)

   where "Left Part" and "Right Part" consist of strings of

symbols from the alphabet of the language and " : " is interpreted to mean "is replaced by."

2. The set of terminals for the language.

CONVERT applies the above inputs and transforms them into rules for a Turing Machine. These rules take one of the following forms:

$$(Q_i, x_1x_2...x_n) = (Q_j, y_1y_2...y_m, \text{Left})$$

$$(Q_i, x_jx_2...x_n) = (Q_j, y_1y_2...y_m, \text{Right})$$

$$(Q_i, x_1x_2...x_n) = (Q_j, y_1y_2...y_m, \text{Null})$$

where

1. Q_i is the present state of the Turing Machine.
2. $x_1x_2...x_n$ are symbols on the tape of the machine which are currently being scanned.
3. Q_j is the next state the Turing Machine will assume.
4. $y_1y_2...y_m$ are symbols which will replace the symbols $x_1x_2...x_n$ on the tape of the Turing Machine. In accordance with the definition of recursively enumerable languages, "m" can be less than, equal to, or greater than "n".
5. Left and Right indicate the direction in which the tape head will next move. Null indicates an epsilon move.

The constructed rules are formed by applying one or more elements from the set of fundamentals listed in Table 1.

In Table 1, "Q_{00}" is the start state for the Turing Machine. "Q_{05}" is the final (accepting) state. "Q_{terminal}" and "Q_{terminal}*" are states which identify with particular terminals in the vocabulary of the language. All other states are intermediate states. "@", "!" and "#" are delimiting and replacement symbols used internally by the system.

1. (Q_{00}, Left Part) = (Q_{00}, Right Part, Null)
2. (Q_{00}, Terminal) = (Q_{00}, Terminal, Right)
3. (Q_{00}, V*) = (Q_{00}, V*, Right)
4. (Q_{00}, !) = (Q_{01}, !, Left)
5. (Q_{00}, @) = (Q_{03}, @, Right)
6. (Q_{01}, Terminal) = (Q_{01}, Terminal, Left)
7. (Q_{01}, @) = (Q_{03}, @, Right)
8. (Q_{03}, Terminal) = ($Q_{terminal}$, #, Left)
9. (Q_{03}, #) = (Q_{03}, #, Right)
10. (Q_{03}, !) = (Q_{04}, !, Left)
11. (Q_{04}, #) = (Q_{04}, #, Left)
12. (Q_{04}, @) = (Q_{04}, @, Left)
13. (Q_{04}, !) = (Q_{05}, !, Right)
14. ($Q_{terminal}$, Terminal)= ($Q_{terminal}$, Terminal, Left)
15. ($Q_{terminal}$, @) = ($Q_{terminal}$, @, Left)
16. ($Q_{terminal}$, !) = ($Q_{terminal}^{*}$, !, Right)
17. ($Q_{terminal}^{*}$, Terminal) = (Q_{00}, !, Right)

Table 1. List of Fundamentals

"V*" is a symbol in the imput alphabet which contributes to, but is not itself a left part of some production. The symbols "B" and "C" in the third example shown in Appendix C represent this type of symbol. "Left Part" and "Right Part" are as defined earlier. The rationale behind the use of each of the fundamentals listed in Table 1 is explained in the description of the second subsystem, PARSER.

B. PARSER

Once the rules for a particular Turing Machine have been constructed UNIPARSE takes the following as inputs:

1. A string of symbols which is to be parsed.
2. A number which represents the maximum length of the left side of any production in the input grammar.

To the input string is addended the following symbols:

1. "!" is addended to the left side of the string.
2. "@" is addended to the right side of the string.
3. The start symbol for the grammar is addended to the right of the "@" symbol.
4. "!" is addended to the right of the start symbol.

If, for example, "$s_1s_2 \dots s_r$" is the inputted string and "S" is the start symbol, the final results of the above operations will be the following string:

$$! \; s_1s_2 \dots s_r @ \; S \; !$$

The resultant string is now placed on the tape of the Turing Machine, the tape head is positioned so that it is scanning the start symbol, and the machine is placed in its initial state. This portion of the system then commences to simulate the operation of the constructed Turing Machine. It does so in the following manner:

1. The string of symbols which lie between the "@" symbol and the rightmost "!" symbol are scanned to determine if any substring consists of the left part of any production rule. The tape head scans substrings of length equal to or less than the maximum length of the left side of any production in the input grammar. If a left part is discovered, rules

constructed from Fundamental #1 in Table 1 are applied and the left part is replaced by the appropriate right part. The resultant string is then stored.

2. If at anytime during this sequence of scanning, the tape head scans a terminal or a non-terminal which is not a left part, these symbols are replaced by themselves in accordance with Fundamentals #2 and #3.
3. If the tape head scans the rightmost "!" symbol while in the initial state, Fundamental #4 is applied and the tape head moves left to determine if a string of terminals have been generated. Rules constructed from Fundamental #6 allow for this.
4. If a string of terminals has been generated, the tape head will eventually arrive at the "@" symbol while still in state "Q_{01}". Fundamental #7 will then be applied, and the machine goes into state "Q_{03}".
5. From this point on the machine will scan alternately to the right and to the left of the "@" symbol to determine if the generated string is identical to the input string. Rules constructed from the remaining fundamentals implement this.
6. If, during the scanning process, a symbol is scanned for which none of the rules for the Turing Machine apply, the string containing that symbol is removed and development of other strings from this string is abandoned.
7. Once this occurs, PARSER removes the earliest previously derived string from storage and repeats steps 1 through 6. If after abandoning a particular path of derivation, PARSER finds that there are no remaining strings in storage, the input string is rejected.

The method described above for constructing the derivation tree for a language is analogous to a Breadth-First tree search. Figure 1 illustrates this type of tree development for the string "12" which is a member of the language consisting of all words containing an equal number of 1's and 2's. The corresponding rules which define the grammar for this language are included in the lower right side of the figure. Each node in the derivation tree represents a derived string. Each connecting arc corresponds to the applicable rule which results in the derivation. The nodes are numbered in terms of their sequence of development.

PARSER, in this case, initially places the start symbol, "S", on the Turing Machine, together with the bracketing symbols and the input string. The Turing Machine scans the start symbol and replaces it with the string "2A". PARSER stores this string and the Turing Machine looks for other deivations from the start symbol. It finds "1B" and replaces the start symbol with it. PARSER then stores this string and the Turing Machine again looks for other derivations. Finding none, the earliest derived string, "2A", is removed from storage and placed on the tape. Derivations numbered four and five are then developed and placed in storage. The Turing Machine discovers that derivation number six results in a string of terminals. At this point it compares the derived string with the input string. The two are not the same, and the derivation is rejected. There are no further derivations from the string "2A" so "1B" is removed from storage and the Turing Machine commences to develop it. As we see from Figure 1. The string "12" is eventually derived, compared and accepted at Node 14. The rules for a Turing Machine for this language are provided, together with the full derivation of a string from the language, in example 1 of Appendix C.

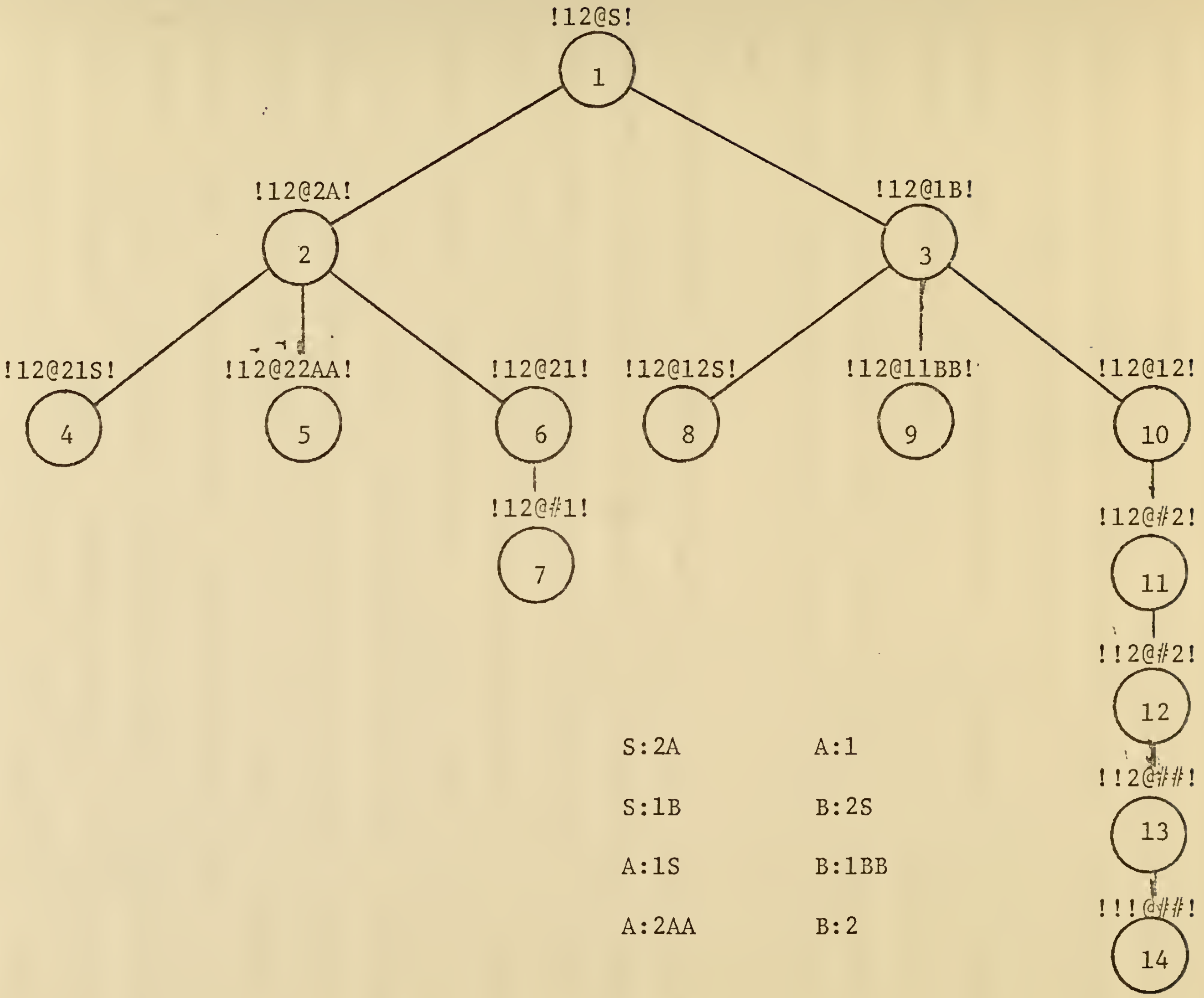
!12@S!
1
!12@2A!
2
!12@1B!
3
!12@21S!
4
!12@22AA!
5
!12@21!
6
!12@#1!
7
!12@12S!
8
!12@11BB!
9
!12@12!
10
!12@#2!
11
!!2@#2!
12
!!2@##!
13
!!!@##!
14
S:2A
S:1B
A:1S
A:2AA
A:1
B:2S
B:1BB
B:2

Figure 1. UNIPARSE String Generation

The reason UNIPARSE develops derivation trees for languages in a Breadth-First fashion rather than in some other way is linked to a well-known phenomena in Automata Theory known as the "Halting Problem." Simply stated, the "Halting Problem" is as follows: Given any Turing Machine with some arbitrary string of symbols on its tape, there is no guarantee that the machine will eventually halt either accepting the string as a member of a language or rejecting it as being invalid. An informal proof of this theorem is found in Reference 1. It is sufficient to say here that the problem is caused by some series of rules for a non-deterministic Turing Machine which, beginning with the replacement of some symbol on its tape, eventually results in a string containing that symbol.

To illustrate the "Halting Problem" and what might happen had we not developed the derivation tree in Figure 1 in a Breadth-First fashion, let us suppose we had developed it using some Depth-First technique. This type of development chooses some single path and pursues this path until it is not possible to generate further strings. Then, and only then, will it attempt to derive strings lying along some other path. For example, a Depth-First development of the derivation tree in Figure 1 might have proceeded down the leftmost branch of the tree. That is, from node number 1 to node number 2 and then to node number 4. At this point, we have created a recursive relationship between rule number one and rule number three in the grammar. Hereafter, the start symbol is always replaced by the sub-string "2A" and the symbol "A" in the resultant string is, in turn, replaced by the start symbol. It is evident that continuing along this path will never lead us to a string of symbols composed entirely of terminals. Hence, the machine will never halt. Furthermore, although the

input string was a word in the language, development of the tree in the manner just described would never have revealed this fact.

On the other hand, construction of the derivation tree using Breadth-First methods ensures that the Turing Machine will not proceed down some single, unproductive path to the exclusion of all other paths. Hence, if the input string is a word in the language, we can be assured that it will eventually be recognized by UNIPARSE.

Searching in Breadth, however, resolves only half of the "Halting Problem": that of recognizing valid strings in a language. We still cannot be sure that invalid strings will be rejected by the system. Even with a Breadth-First approach, if there exists a path in the derivation tree which does not end in a string of terminals, the Turing Machine will never halt, rejecting an invalid string. The heuristic applied by UNIPARSE to resolve this portion of the problem is to bound the development of the derivation tree. That is, the tree will be allowed to develop only to a certain, specified depth.

This is a viable solution if we accept the condition that any language which we might wish to parse contains only a finite number of words. If the language is finite, and if the derivation tree for the language is developed in Breadth, after some finite number of derivations, all words in the language will be generated. The bound for the tree is set at the depth at which this occurs. If the input string has not been generated prior to reaching this level, it cannot be a member of the language and will be rejected. The system does not determine for arbitrary grammars what this level is. It must be specified by the user for the language he wishes to parse.

C. SUMMARY

UNIPARSE is a simulation of a Universal Turing Machine; which, given specified inputs, will parse any finite, recursively enumerable language. The system consists of two major subsystems: CONVERT, which constructs a Turing Machine for parsing the language; and PARSER, which uses the constructed machine and a Bounded Breadth-First derivation tree development scheme to parse input languages.

III. CONCLUSION

It is clear from the preceeding description that UNIPARSE is capable of parsing finite, recursively enumerable languages. The system has been implemented and tested on Regular, Context Free, Context Sensitive, and Type 0 languages. The following are the observed results from these tests:

1. The system, in fact, defines a workable method for parsing recursively enumerable languages. UNIPARSE parsed correctly all test languages. Appendix C contains examples of some of these tests.
2. The system as presently developed is somewhat slow and demanding of storage space. This is due, in part, to the fact that the system was designed to demonstrate the feasibility of implementing a generalized method for parsing languages. As a result, programming efficiency was sacrificed for readability and clarity of understanding.

The value of the system lies in its generality. The existence of UNIPARSE allows for the development of computer programming languages of higher order than those presently available. In addition, the system provides a single method for parsing all computer languages of order Type 0 or less.

APPENDIX A

USER's MANUAL FOR UNIPARSE

The system is designed for batch processing. The user, in addition to the main program, must input the following items:

1. Item: The set of productions for the grammar of the language to be parsed.
2. Item: The set of terminals for the language.
   Format: 80A1
3. Item: The Start symbol for the language.
   Format: 1A4
4. Item: The Maximum length of the left side of any production in the input grammar.
   Format: 1I20
5. Item: The number or nodes to be generated by the system.
   Format: 1I6

The following are outputs from the system:

1. The input set of productions.
2. The set of terminals for the language.
3. A listing of the rules for the Turing Machine used to recognize the input language.
4. The start and final (accepting) states of the Turing Machine.
5. A sequential listing of the strings of symbols generated by the system.

6. The location of the symbol on the tape of the Turing Machine which is currently being scanned.
7. The state which the Turing Machine is in.

In addition to the above outputs, UNIPARSE provides the following outputs which are dependent upon whether or not the input string is a valid word in the language or not:

1. If the word is rejected, the system informs the user of this and points out the invalid symbol.
2. If the input string is a word in the language, the system so informs the user.

The following restrictions are programmed into the system:

1. Languages containing as members of their alphabets the following symbols are not allowable:
    a. "!"
    b. "#"
    c. "@"

    These symbols are used internally by the system, and, hence, cannot be treated as language symbols. Replacement of these symbols by other symbols provides a simple solution to this problem.
2. The program currently provides for one minute of computing time and occupies 150k of core space. If more time or space are required, appropriate job control cards for the main program must be modified.

APPENDIX B
UNIPARSE PROGRAM

```
C     UNIPARSE:
C
C
C         A FORTRAN PROGRAM DESIGNED TO PARSE FINITE, RECUR-
C     SIVELY ENUMERABLE LANGUAGES.  THE PROGRAM UTILIZES THE
C     CONCEPT OF UNIVERSAL TURING MACHINES AND BREADTH-FIRST
C     SEARCH TECHNIQUES TO ACCOMPLISH THE PARSING
C     PROCESS.
C
C
C
C
C                      PROGRAM DESCRIPTION
C
C     *******************************************************
C     *                                                     *
C     *                                                     *
C     *                                                     *
C     *                      INPUTS                         *
C     *                                                     *
C     *                                                     *
C     *                                                     *
C     *INPUT        DESCRIPTION                     FORMAT  *
C     *                                                     *
C     *                                                     *
C     *SJS          LANGUAGE START SYMBOL           1A2     *
C     *                                                     *
C     *TERMINALS    THE SET OF LANGUAGE TERMINALS.  80A1    *
C     *                                                     *
C     *MLS          THE LENGTH OF THE LONGEST LEFT  1A4     *
C     *             SIDE OF ANY INPUT PRODUCTION.           *
C     *                                                     *
C     *PRODUCTIONS  THE SET OF PRODUCTIONS WHICH    80A1    *
C     *             DEFINE THE LANGUAGE GRAMMAR.            *
C     *                                                     *
C     *WORD         THE STRING OF SYMBOLS TO BE     80A1    *
C     *             PARSED.                                 *
C     *                                                     *
C     *COUNT        THE MAXIMUM NUMBER OF STRINGS   1I4     *
C     *             TO BE GENERATED.                        *
C     *                                                     *
C     *                                                     *
C     *                                                     *
C     *                   OUTPUTS                           *
C     *                                                     *
C     *                                                     *
C     *THE INPUT SET OF PRODUCTIONS                         *
C     *                                                     *
C     *THE SET OF TERMINALS                                 *
C     *                                                     *
C     *THE RULES FOR THE TURING MACHINE USED TO PARSE THE   *
C     *INPUT STRING                                         *
C     *                                                     *
C     *THE INITIAL AND FINAL STATES OF THE TURING MACHINE   *
C     *                                                     *
C     *THE INPUT STRING                                     *
C     *                                                     *
C     *THE STATUS OF THE TURING MACHINE DURING THE PARSING  *
C     *PROCESS.  ALL DERIVED STRINGS ARE PRINTED OUT AND    *
C     *THE SYMBOL BEING SCANNED AND THE STATE THE TURING    *
C     *MACHINE IS IN ARE INCLUDED IN THIS DESCRIPTION       *
C     *AMESSAGE INDICATING WHETHER OR NOT THE INPUT STRING  *
C     *IS A VALID WORD IN THE INPUT LANGUAGE.               *
C     *                                                     *
C     *                                                     *
C     *                                                     *
C     *******************************************************
```

```
C
C
C
C
C     *******************************************************
C     *******************************************************
C     *                      SETUP                          *
C     *******************************************************
C     *******************************************************
C
C
C
C     DECLARE VARIABLE TYPE.
      IMPLICIT INTEGER(A-Z)
C
C     DIMENSION VECTORS.
C
      DIMENSION D(1000),W(1000),T(5000),IT1(1000)
      DIMENSION IT(1000),IR(1000),IL(1000),TI(1000)
      DIMENSION CTRAN(25),ND(50)
C
      DATA CTRAN/1H ,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9,
     12H00,2H01,2H02,2H03,2H04,2H05,2H06,2H07,2H08,2H09,
     22H10,1H#,1H@,1H|,1H:/
C
C
      MAXINT=2**31-1
C     MASK OUT ALL VECTORS.
C
      DO 1 I=1,1000
      D(I)=MAXINT
      IT(I)=MAXINT
      IR(I)=MAXINT
      IL(I)=MAXINT
      TI(I)=MAXINT
      W(I)=MAXINT
      IT1(I)=MAXINT
    1 CONTINUE
      DO 799 K=1,5000
      T(K)=MAXINT
  799 CONTINUE
      DO 1688 I=1,50
      ND(I)=MAXINT
 1688 CONTINUE
C
C
C
C     READ IN THE LANGUAGE START SYMBOL.
C
      READ(5,2900)SJS
 2900 FORMAT(1A1)
C
C     READ IN THE SET OF TERMINALS.
C
      READ(5,2650)(TI(K),K=5,80)
      READ(5,2650)(T(K),K=1,80)
 2650 FORMAT(80A1)
C
C     INITIALIZE BRACKETING SYMBOLS FOR WORD.
C
      TI(1)=CTRAN(22)
      TI(2)=CTRAN(23)
      TI(3)=CTRAN(24)
      TI(4)=CTRAN(25)
C
      READ(5,1000)MLS
 1000 FORMAT(1I1)
C
C     READ IN THE MAXIMUM NUMBER OF STRINGS TO BE
C     GENERATED.
      READ(5,8010)COUNT
 8010 FORMAT('0',1I4)
```

```
C
C
C
      WRITE(6,2653)
 2653 FORMAT('0','THE SET OF PRODUCTIONS IS AS FOLLOWS:')
      WRITE(6,1101)
      L=1
      J=1
 2608 READ(5,2603) (IT(K),K=1,80)
 2603 FORMAT(80A1)
      DO 2604 K=1,80
      IF(IT(K).EQ.OTRAN(22)) GO TO 2607
      IF(IT(K).EQ.OTRAN(1)) GO TO 2607
 2604 CONTINUE
 2607 K=K-1
      WRITE(6,2654)(IT(I),I=1,K)
 2654 FORMAT('0',80A1)
C
C
C     TRANSFER PRODUCTION SET INTO VECTORS IR AND IL.
C
      K=1
      J=J+1
      JJ=J-1
      KK=1
 2639 IR(J)=IT(KK)
      K=K+1
      J=J+1
      KK=KK+1
      IF(IT(KK).NE.OTRAN(25)) GO TO 2639
      IR(JJ)=KK-1
      L=L+1
      KKK=1
      LL=L-1
      KK=KK+1
 2641 IL(L)=IT(KK)
      L=L+1
      KK=KK+1
      KKK=KKK+1
      IF(IT(KK).EQ.OTRAN(22)) GO TO 6210
      IF(IT(KK).NE.OTRAN(1)) GO TO 2641
      IL(LL)=KKK-1
      GO TO 2608
 6210 IJK=J
      KJI=L
      IL(LL)=KKK-1
      I=1
 6211 IR(J)=1
      J=J+1
      IR(J)=TI(I)
      IL(L)=1
      L=L+1
      IL(L)=TI(I)
      I=I+1
      IF(TI(I).EQ.OTRAN(1)) GO TO 2610
      J=J+1
      L=L+1
      GO TO 6211
 2610 DO 2611 K=1,80
      IT(K)=MAXINT
 2611 CONTINUE
      RPL=L+1
      RPJ=J+1
C
C     DETERMINE THE NONTERMINALS AND STORE THEM IN IR
C
      A=1
 2676 J=J+1
      IF(T(A).EQ.OTRAN(1)) GO TO 8040
      L=L+1
      IR(J)=1
      IL(L)=1
```

```
      J=J+1
      L=L+1
      IR(J)=T(A)
      IL(L)=T(A)
      A=A+1
      IF(T(A).NE.OTRAN(1)) GO TO 2676
      J=J+1
      IR(J)=MAXINT
 8040 JRP=J
C
C     WRITE OUT THE SET OF TERMINALS.
C
 2655 WRITE(6,2657)
 2657 FORMAT('0','THE SET OF TERMINALS IS AS FOLLOWS:')
      WRITE(6,1101)
      DO 2651 K=1,80
      IF(TI(K).EQ.OTRAN(1)) GO TO 2652
 2651 CONTINUE
 2652 III=K-1
  112 WRITE(6,2658)(TI(I),I=5,III)
 2658 FORMAT('0',20(50A1,/' '))
      WRITE(6,1101)
      WRITE(6,1101)
C
C
C     *****************************************************
C     *****************************************************
C     *                     CONVERT                       *
C     *****************************************************
C     *****************************************************
C
C
C     CONVERT LANGUAGE PRODUCTION SET INTO TURING MACHINE
C     FORM AND STORE IN VECTOR D.
C
C
      I=1
      K=1
      M=1
      J=IJK
      L=KJI
      II=5
C
C
C     (Q(00), LEFT PART) = (Q(00), RIGHT PART, RIGHT)
C
 2700 D(I)=OTRAN(11)
      I=I+1
      D(I)=K
      K=IR(K)+1+K
      I=I+1
      D(I)=OTRAN(11)
      I=I+1
      D(I)=M
      M=IL(M)+1+M
      I=I+1
      D(I)=2
      I=I+1
      IF(K.NE.IJK) GO TO 2700
C     (Q(00), SYMBOL) = (Q(00), SYMBOL, RIGHT)
C     (Q(00), TERMINAL) = (Q(00), TERMINAL, RIGHT)
C
 2701 D(I)=OTRAN(11)
      I=I+1
      D(I)=J+8
      J=J+2
      I=I+1
      D(I)=OTRAN(11)
      I=I+1
      D(I)=L+8
      L=L+2
      I=I+1
```

```
      C(I)=1
      I=I+1
      K=J+8
      IF(K.NE.JRP) GO TO 2701
      J=IJK
      L=KJI
C
C     (Q(00), |) = (Q(01), |, LEFT)
C
 2702 C(I)=CTRAN(11)
      I=I+1
      C(I)=IJK+4
      I=I+1
      C(I)=CTRAN(12)
      I=I+1
      C(I)=KJI+4
      I=I+1
      C(I)=0
      I=I+1
C
C     (Q(00),@) = (Q(03), @, RIGHT)
 2703 C(I)=CTRAN(11)
      I=I+1
      C(I)=IJK+2
      I=I+1
      C(I)=CTRAN(14)
      I=I+1
      C(I)=KJI+2
      I=I+1
      C(I)=1
      I=I+1
C
C     (Q(01), TERMINAL) = (Q(01), TERMINAL, LEFT)
C
 2704 C(I)=CTRAN(12)
      I=I+1
      C(I)=J+8
      J=J+2
      I=I+1
      C(I)=CTRAN(12)
      I=I+1
      C(I)=L+8
      L=L+2
      I=I+1
      C(I)=0
      I=I+1
      K=J+8
      IF(K.NE.RPJ) GO TO 2704
      J=IJK
      L=KJI
C
C     (Q(01), @) = (Q(03), @, RIGHT)
C
 2706 C(I)=CTRAN(12)
      I=I+1
      C(I)=IJK+2
      I=I+1
      C(I)=CTRAN(14)
      I=I+1
      C(I)=KJI+2
      I=I+1
      C(I)=1
      I=I+1
C
C     (Q(03), TERMINAL) =(Q(TERMINAL), #, LEFT)
C
 2707 C(I)=CTRAN(14)
      I=I+1
      C(I)=J+8
      J=J+2
      I=I+1
      C(I)=TI(II)
```

```
      II=II+1
      I=I+1
      C(I)=KJI
      I=I+1
      C(I)=0
      I=I+1
      IF(TI(II).NE.OTRAN(1)) GC TO 2707
      J=IJK
      II=5
C
C     (Q(03), #) = (Q(C3), #, RIGHT)
C
 27C8 C(I)=CTRAN(14)
      I=I+1
      C(I)=IJK
      I=I+1
      C(I)=OTRAN(14)
      I=I+1
      C(I)=KJI
      I=I+1
      C(I)=1
      I=I+1
C
C     (Q(C3), |) = (Q(04), |, LEFT)
C
 27C9 C(I)=CTRAN(14)
      I=I+1
      C(I)=IJK+4
      I=I+1
      C(I)=OTRAN(15)
      I=I+1
      C(I)=KJI+4
      I=I+1
      C(I)=0
      I=I+1
C
C     (Q(C4), #) = (Q(C4), #, LEFT)
C
 2712 C(I)=CTRAN(15)
      I=I+1
      C(I)=IJK
      I=I+1
      D(I)=CTRAN(15)
      I=I+1
      D(I)=KJI
      I=I+1
      C(I)=C
      I=I+1
C
C     (Q(C4), @) = (Q(C4), @, LEFT)
C
 271C C(I)=CTRAN(15)
      I=I+1
      C(I)=IJK+2
      I=I+1
      C(I)=CTRAN(15)
      I=I+1
      C(I)=KJI+2
      I=I+1
      C(I)=0
      I=I+1
C
C     (Q(C4), |) =(Q(05), |, RIGHT)
C
 2711 C(I)=CTRAN(15)
      I=I+1
      C(I)=IJK+4
      I=I+1
      C(I)=OTRAN(16)
      I=I+1
      C(I)=KJI+4
      I=I+1
```

```
      C(I)=1
      I=I+1
C
C     (G(TERMINAL),TERMINAL = (G(TERMINAL),TERMINAL,LEFT)
C
 2713 C(I)=TI(II)
      I=I+1
      C(I)=J+8
      J=J+2
      I=I+1
      C(I)=TI(II)
      I=I+1
      C(I)=L+8
      L=L+2
      I=I+1
      D(I)=C
      I=I+1
      K=J+8
      IF(K.NE.RFJ) GC TC 2713
      II=II+1
      J=IJK
      L=KJI
      IF(TI(II).NE.OTRAN(1)) GO TO 2713
      II=5
      J=IJK
      L=KJI
C
C     (G(TERMINAL), |) = (G(TERMINAL +6), |, RIGHT)
C
 2715 C(I)=TI(II)
      I=I+1
      C(I)=IJK+4
      I=I+1
      D(I)=CTRAN(17)+TI(II)
      I=I+1
      II=II+1
      C(I)=KJI+4
      I=I+1
      C(I)=1
      I=I+1
      IF(TI(II).NE.OTRAN(1)) GO TO 2715
      II=5
C
C     (G(TERMINAL), #) = (Q(TERMINAL), #, LEFT)
C
 2718 C(I)=TI(II)
      I=I+1
      C(I)=IJK
      I=I+1
      C(I)=TI(II)
      I=I+1
      II=II+1
      C(I)=KJI
      I=I+1
      C(I)=0
      I=I+1
      IF(TI(II).NE.OTRAN(1)) GO TO 2718
      II=5
C
C     (G(TERMINAL), @) = (Q(TERMINAL), @, LEFT)
C
 2714 C(I)=TI(II)
      I=I+1
      C(I)=IJK+2
      I=I+1
      D(I)=TI(II)
      II=II+1
      I=I+1
      C(I)=KJI+2
      I=I+1
      C(I)=C
      I=I+1
```

```
      IF(TI(II).NE.OTRAN(1)) GO TO 2714
      II=5
C
C     (Q(TERMINAL+6), TERMINAL) = (Q(00), |, RIGHT)
C
 2716 D(I)=CTRAN(17)+TI(II)
      I=I+1
      D(I)=J+8
      J=J+2
      I=I+1
      D(I)=CTRAN(11)
      I=I+1
      D(I)=KJI+4
      I=I+1
      II=II+1
      D(I)=1
      I=I+1
      IF(TI(II). NE.OTRAN(1)) GO TO 2716
C
C
C     PRINT OUT THE CONFIGURATION OF THE TURING MACHINE.
C
      WRITE(6,1555)
 1555 FORMAT('0','TURING MACHINE FORM OF THE LANGUAGE IS:')
      WRITE(6,1101)
      WRITE(6,4344)
 4344 FORMAT('0','RULE #',3X,'IN STATE',3X,'SCANNING',3X,
     1'NEXT STATE',2X,'PRINT',7X,'MOVE')
      WRITE(6,8334)
 8334 FORMAT('0',20X,'SYMBOLS',17X,'SYMBOLS')
      WRITE(6,1105)
 1105 FORMAT('0','   ')
      RN=0
      I=1
 4342 DO 4341 J=1,70
      T(J)=OTRAN(1)
 4341 CONTINUE
      JJ=1
      RN=RN+1
      JJ=5
      T(JJ)=D(I)
      I=I+1
      J=D(I)
      K=IR(J)
      L=J+1
      M=J+K
      JJ=10
      DO 4336 KK=L,M
      T(JJ)=IR(KK)
      JJ=JJ+1
 4336 CONTINUE
      JJ=16
      I=I+1
      T(JJ)=D(I)
      JJ=21
      I=I+1
      J=D(I)
      K=IL(J)
      L=J+1
      M=J+K
      DO 4337 KK=L,M
      T(JJ)=IL(KK)
      JJ=JJ+1
 4337 CONTINUE
      I=I+1
      IF(D(I).EQ.1) GO TO 4339
      IF(D(I).EQ.2) GO TO 4350
      WRITE(6,4338)RN,(T(L),L=1,26)
 4338 FORMAT('0',I13,26A2,'LEFT')
      GO TO 4349
 4339 WRITE(6,4340)RN,(T(L),L=1,26)
 4340 FORMAT('0',I13,26A2,'RIGHT')
```

```
      GO TO 4349
 4350 WRITE(6,4351)RN,(T(L),L=1,26)
 4351 FORMAT('0',I13,26A2,'NULL')
 4349 I=I+1
      IF(D(I).NE.MAXINT) GO TO 4342
      DO 4343 J=1,70
      T(J)=MAXINT
 4343 CONTINUE
      WRITE(6,1101)
      WRITE(6,1101)
      WRITE(6,9922)
 9922 FORMAT('0','THE INITIAL STATE IS STATE "00".')
      WRITE(6,1101)
      WRITE(6,9923)
 9923 FORMAT('0','THE FINAL(ACCEPTING)STATE IS STATE "05".')
      WRITE(6,1101)
      WRITE(6,1101)
C
C
C
C     READ PROGRAM INTO VECTOR W
C
      JJJ=2
 2612 READ(5,2613) (IT(K),K=1,80)
 2613 FORMAT(80A1)
      DO 2614 K=1,80
      IF(IT(K).EQ.OTRAN(1)) GO TO 2617
 2614 CONTINUE
      K=1
      J=JJJ
 2615 W(J)=IT(K)
      IF(K.EQ.80) GO TO 2616
      K=K+1
      J=J+1
      GO TO 2615
 2616 JJJ=JJJ+80
      GO TO 2612
 2617 JJ=K
      KKK=K
      KK=1
      DO 2618 J=JJJ,JJ
      W(J)=IT(KK)
      KK=KK+1
 2618 CONTINUE
      RK=2*(JJ-1)+3
 2619 DO 2620 K=1,80
      IT(K)=MAXINT
 2620 CONTINUE
C
C
C     WRITE OUT THE INPUTTED WORD.
C
      WRITE(6,5434)
 5434 FORMAT('0','THE INPUTTED WORD IS AS FOLLOWS:')
      WRITE(6,1101)
      WRITE(6,2658)(W(K),K=2,J)
C
C
      WRITE(6,1101)
      WRITE(6,1101)
      WRITE(6,8020)
 8020 FORMAT('0','A TRACE OF THE PARSING PROCESS')
C     ADDEND THE BRACKETING SYMBOLS TO THE INPUTTED WORD.
C
      J=J+1
      W(J)=OTRAN(23)
      J=J+1
      W(J)=SJS
      PRG=J
      J=J+1
      W(J)=OTRAN(24)
      W(1)=CTRAN(24)
```

```
C
C
C
C
C     ******************************************************
C     ******************************************************
C     *                      PARSER                        *
C     ******************************************************
C     ******************************************************
C
C
C     COMMENCE PARSING THE LANGUAGE
C
C     INITIALIZE INDEXES OF VECTORS.
C
      DO 3 K=1,5000
      T(K)=MAXINT
    3 CONTINUE
      T(1)=OTRAN(1)
      N=0
      RPG=MLS
      NS=OTRAN(11)
      I=1
      J=PRG
      ICOUNT=0
C
C     SEARCH FOR THE INDICATED STATE.
C
    6 I=1
    5 IF(D(I).EQ.NS) GO TO 7
      IF(D(I).EQ.MAXINT) GO TO 12
      I=I+5
      GO TO 5
C
C     STATE FOUND.
C     SEARCH FOR THE INDICATED SYMBOL.
C
    7 DO 15 K=1,1000
      IT(K)=MAXINT
   15 CONTINUE
      K=1
      RK=J
    8 IT(K)=W(J)
      IF(K.EQ.RPG) GO TO 9
      K=K+1
      J=J+1
      IF(W(J).NE.MAXINT) GO TO 8
C
C     DECREASE T HE NUMBER OF SYMBOLS TO BE SCANNED
C     BY ONE.
C
   14 RPG=RPG-1
      J=PRG
      IF(RPG.NE.0) GO TO 6
      GO TO 16
    9 IF(W(J).EQ.MAXINT) GO TO 14
      I=I+1
      TT=D(I)
      TTT=IR(TT)
      IF(TTT.NE.K) GO TO 11
      TTTT=TT+1
      TTTTT=TTTT+TTT
      KK=1
   10 IF(TTTT.EQ.TTTTT) GO TO 26
      IF(IR(TTTT).NE.IT(KK)) GO TO 11
      TTTT=TTTT+1
      KK=KK+1
      GO TO 10
   11 I=I+4
      IF(D(I).EQ.MAXINT) GO TO 12
      IF(D(I).NE.NS) GO TO 11
      GO TO 9
```

```
   26 N=N+1
      R=TTT
      ICOUNT=ICOUNT+1
      IF(ICOUNT.EQ.COUNT) GO TO 999
      ND(N)=I-1
      GO TO 11
   73 J=RK+1
      GO TO 6
C
C     SYMBOLS SOUGHT FOR FOUND.
C     PUT UNMODIFIED WORD INTO VECTOR IT1
   12 IF(ND(1).EQ.MAXINT) GO TO 73
      DO 337 K=1,100
      IT1(K)=MAXINT
      IT(K)=MAXINT
  337 CONTINUE
C
      K=1
      L=1
   13 IT1(K)=W(L)
      K=K+1
      L=L+1
      IF(W(L).NE.MAXINT) GO TO 13
C
C     SHIFT RIGHT PORTION OF WORD INTO VECTOR IT.
C
      KR1=RK+R
      K=1
   34 IT(K)=W(KR1)
      W(KR1)=MAXINT
      K=K+1
      KR1=KR1+1
      IF(W(KR1).NE.MAXINT) GO TO 34
C
C     MASK OUT PORTION OF WORD TO BE MODIFIED.
C
   53 W(J)=MAXINT
      IF(J.EQ.RK) GO TO 35
      J=J-1
      GO TO 53
C
C     WRITE OVER SYMBOLS SCANNED.
C
   35 I=I+2
      I=ND(N)+3
      ND(N)=MAXINT
      N=N-1
      TT=D(I)
      TK=IL(TT)-1
      TLL=TT+1
      TKK=TLL+TK
      DO 36 K=TLL,TKK
      W(J)=IL(K)
      J=J+1
   36 CONTINUE
C
C     SHIFT RIGHT PORTION OF WORD BACK INTO
C     MODIFIED WORD.
C
      K=1
   37 W(J)=IT(K)
      K=K+1
      J=J+1
      IF(IT(K).NE.MAXINT) GO TO 37
      WRITE(6,8002)
 8002 FORMAT('0','THE STRING OF SYMBOLS ON THE TAPE IS:')
      K=1
 8090 IF(W(K).EQ.MAXINT) GO TO 8089
      K=K+1
      GO TO 8090
 8089 K=K-1
      WRITE(6,2658)(W(L),L=1,K)
```

```
      DO 711 K=1,1000
      IT(K)=MAXINT
  711 CONTINUE
C
C     SEE WHAT THE NEXT STATE IS.
C
      I=I-1
      NS=D(I)
C
C     SEE IF THE NEXT STATE IS THE FINAL STATE.
C
      IF(D(I).EQ.OTRAN(16)) GO TO 3000
C
C     SEE WHICH WAY THE TAPE IS TO BE MOVED.
C
      I=I+2
      IF(D(I).EQ.1) GO TO 43
      IF(D(I).EQ.2) GO TO 44
C
C     MOVE IS TO THE LEFT
C
      J=RK-1
      GO TO 45
C
C     MOVE IS TO THE RIGHT.
C
   43 J=RK+1
      GO TO 45
   44 J=PRG
C
C
C     PUT MODIFIED WORD INTO T.
   45 K=0
      WRITE(6,8000)J
 8000 FORMAT('0','THE SYMBOL BEING SCANNED IS SYMBOL #',I13)
      WRITE(6,8001)NS
 8001 FORMAT('0','THE TURING MACHINE IS IN STATE ',1A2)
      IF(NS.EQ.OTRAN(12)) GO TO 332
      L=1
   46 K=K+1
      IF(T(K).EQ.OTRAN(1)) GO TO 391
      IF(T(K).NE.MAXINT) GO TO 46
  391 T(K)=NS
      K=K+1
      T(K)=J
      K=K+1
   39 T(K)=W(L)
      L=L+1
      K=K+1
      IF(W(L).NE.MAXINT) GO TO 39
      DO 712 K=1,1000
      W(K)=MAXINT
  712 CONTINUE
C
C     PUT UNMODIFIED WORD BACK INTO VECTOR W.
C
      K=0
      L=1
   41 K=K+1
      IF(IT1(K).EQ.MAXINT) GO TO 42
      W(L)=IT1(K)
      IT1(K)=MAXINT
      L=L+1
      GO TO 41
   42 J=RK
      DO 713 K=1,1000
      IT1(K)=MAXINT
  713 CONTINUE
      GO TO 12
   16 DO 166 L=1,1000
      W(L)=MAXINT
  166 CONTINUE
```

```
C
C     TRANSFER THE FIRST WORD IN T INTO W.
C
      L=1
      NS=T(L)
      T(L)=MAXINT
      L=L+1
      J=T(L)
      T(L)=MAXINT
      L=L+1
      K=0
   17 K=K+1
      W(K)=T(L)
      T(L)=MAXINT
      L=L+1
      IF(T(L).NE.OTRAN(24)) GO TO 17
      K=K+1
      W(K)=T(L)
      T(L)=MAXINT
      L=L+1
      K=0
   18 K=K+1
      T(K)=T(L)
      T(L)=MAXINT
      L=L+1
      IF(T(L).NE.MAXINT) GO TO 18
      RPG=MLS
      GO TO 6
  332 PN=1
      I=1
  333 IF(D(I).EQ.NS) GO TO 334
      IF(D(I).EQ.MAXINT) GO TO 342
      PN=PN+1
      I=I+5
      GO TO 333
C
C     STATE FOUND. SEE IF SYMBOLS MATCH.
C
  334 I=I+1
      TT=D(I)
      IF(IR(TT).NE.1) GO TO 7152
      TTT=TT+1
      IF(IR(TTT).EQ.W(J)) GO TO 335
 7152 I=I+4
      PN=PN+1
      GO TO 333
C
C     SYMBOLS MATCH.  SEE IF NEXT STATE IS FINAL STATE.
C
  335 I=I+1
      NS=D(I)
      IF(NS.EQ.OTRAN(16)) GO TO 3000
C
C     NEXT STATE IS NOT A FINAL STATE.  MODIFY WORD.
C
      I=I+1
      TT=D(I)
      TTT=TT+1
      W(J)=IL(TTT)
C
C     SEE WHICH DIRECTION TO MOVE TAPE HEAD.
C
      I=I+1
      IF(D(I).EQ.1) GO TO 336
C
C     MOVE IS TO THE LEFT.
C
      J=J-1
      GO TO 373
C
C     MOVE IS TO THE RIGHT.
C
```

```
  336 J=J+1
  373 K=1
  374 K=K+1
      IF(W(K).NE.MAXINT) GO TO 374
      K=K-1
      WRITE(6,8002)
      WRITE(6,2658)(W(L),L=1,K)
      WRITE(6,8000)J
      WRITE(6,8001)NS
 6342 FORMAT('0',1I3)
      GO TO 332
  342 K=1
  631 W(K)=MAXINT
      K=K+1
      IF(W(K).NE.MAXINT) GO TO 631
      GO TO 12
C     REJECT THE WORD.
C
  999 WRITE(6,2000)
 2000 FORMAT('0','WORD REJECTED ')
      WRITE(6,1101)
 1101 FORMAT('0','    ')
      WRITE(6,2001)ICOUNT
 2001 FORMAT('0',1I4,' STRINGS HAVE BEEN GENERATED')
      GO TO 9999
 3000 WRITE(6,3001)
 3001 FORMAT('0','WORD ACCEPTED')
 9999 STOP
      END
```

APPENDIX C

SAMPLE UNIPARSE OUTPUTS

```
EXAMPLE 1:  PARSING A TYPE 0 LANGUAGUE.


THE SET OF PRODUCTIONS IS AS FOLLOWS:

K:SSS
SSS:0SSS1
SSS:01

THE SET OF TERMINALS IS AS FOLLOWS:

01


TURING MACHINE FORM OF THE LANGUAGE IS:

RULE #    IN STATE    SCANNING     NEXT STATE   PRINT          MOVE
                      SYMBOLS                    SYMBOLS

  1          00       K              00         S S S          NULL
  2          00       S S S          00         0 S S S 1      NULL
  3          00       S S S          00         0 1            NULL
  4          00       0              00         0              RIGHT
  5          00       1              00         1              RIGHT
  6          00       S              00         S              RIGHT
  7          00       |              01         |              LEFT
  8          00       @              03         @              RIGHT
  9          01       0              01         0              LEFT
 10          01       1              01         1              LEFT
 11          01       @              03         @              RIGHT
 12          03       0              0          #              LEFT
 13          03       1              1          #              LEFT
 14          03       #              03         #              RIGHT
 15          03       |              04         |              LEFT
 16          04       #              04         #              LEFT
 17          04       @              04         @              LEFT
 18          04       |              05         |              RIGHT
 19          0        0              0          0              LEFT
 20          0        1              0          1              LEFT
 21          1        0              1          0              LEFT
 22          1        1              1          1              LEFT
 23          0        |              /6         |              RIGHT
 24          1        |              S6         |              RIGHT
 25          0        #              0          #              LEFT
 26          1        #              1          #              LEFT
 27          0        @              0          @              LEFT
 28          1        @              1          @              LEFT
 29          /6       0              00         |              RIGHT
 30          S6       1              00         |              RIGHT

THE INITIAL STATE IS STATE "00".

THE FINAL(ACCEPTING)STATE IS STATE "05".

THE INPUTTED WORD IS AS FOLLOWS:

0011

A TRACE OF THE PARSING PROCESS
```

```
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011āSSS|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011āK|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā01|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā0SSS1|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011āSSS|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011āSSS|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011āSSS|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011āSSS|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā01|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā01|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā01|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā01|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā01|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā01|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā#1|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā#1|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā#1|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā#1|
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THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  1
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE /6
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
||011ā##|
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||011ā##|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
||011ā##|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
||011ā##|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE S6
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā0011|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā00SSS11|
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THE SYMBOL BEING SCANNED IS SYMBOL #  7
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 11
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 11
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011@SSS|
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
||011ā#1|
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THE SYMBOL BEING SCANNED IS SYMBOL #  6
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā#1|
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THE TURING MACHINE IS IN STATE /6
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   2
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THE STRING OF SYMBOLS ON THE TAPE IS:
||011ā##|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE S6
THE STRING OF SYMBOLS ON THE TAPE IS:
|0011ā0011|
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  7
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE /6
THE STRING OF SYMBOLS ON THE TAPE IS:
||011ā#011|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||011ā#011|
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THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   7
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   4
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā##11|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā##11|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā##11|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā##11|
THE SYMBOL BEING SCANNED IS SYMBOL #   9
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā###1|
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā###1|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā###1|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  4
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THE STRING OF SYMBOLS ON THE TAPE IS:
|||11ā###1|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
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THE SYMBOL BEING SCANNED IS SYMBOL #  5
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1ā###1|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1ā###1|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1ā####|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1ā####|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1ā####|
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THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE S6
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  7
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1â####|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1â####|
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THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1â####|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1â####|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||||1â####|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 04
WORD ACCEPTED
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EXAMPLE 2:  PARSING A CONTEXT SENSITIVE LANGUAGE.


THE SET OF PRODUCTIONS IS AS FOLLOWS:

S:1SBC
S:1BC
CB:BC
1B:12
2B:22
2C:23
3C:33


THE SET OF TERMINALS IS AS FOLLOWS:

123


TURING MACHINE FORM OF THE LANGUAGE IS:

RULE #    IN STATE    SCANNING    NEXT STATE   PRINT       MOVE
                      SYMBOLS                   SYMBOLS

   1         00         S            00         1 S B C     NULL
   2         00         S            00         1 B C       NULL
   3         00         C B          00         B C         NULL
   4         00         1 B          00         1 2         NULL
   5         00         2 B          00         2 2         NULL
   6         00         2 C          00         2 3         NULL
   7         00         3 C          00         3 3         NULL
   8         00         1            00         1           RIGHT
   9         00         2            00         2           RIGHT
  10         00         3            00         3           RIGHT
  11         00         B            00         B           RIGHT
  12         00         C            00         C           RIGHT
  13         00         |            01         |           LEFT
  14         00         @            03         @           RIGHT
  15         01         1            01         1           LEFT
  16         01         2            01         2           LEFT
  17         01         3            01         3           LEFT
  18         01         @            03         @           RIGHT
  19         03         1            1          #           LEFT
  20         03         2            2          #           LEFT
  21         03         3            3          #           LEFT
  22         03         #            03         #           RIGHT
  23         03         |            04         |           LEFT
  24         04         #            04         #           LEFT
  25         04         @            04         @           LEFT
  26         04         |            05         |           RIGHT
  27         1          1            1          1           LEFT
  28         1          2            1          2           LEFT
  29         1          3            1          3           LEFT
  30         2          1            2          1           LEFT
  31         2          2            2          2           LEFT
  32         2          3            2          3           LEFT
  33         3          1            3          1           LEFT
  34         3          2            3          2           LEFT
  35         3          3            3          3           LEFT
  36         1          |            S6         |           RIGHT
  37         2          |            T6         |           RIGHT
  38         3          |            U6         |           RIGHT
  39         1          #            1          #           LEFT
  40         2          #            2          #           LEFT
  41         3          #            3          #           LEFT
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  42          1           @            1             @               LEFT
  43          2           @            2             @               LEFT
  44          3           @            3             @               LEFT
  45          S6          1            00            |               RIGHT
  46          T6          2            00            |               RIGHT
  47          L6          3            00            |               RIGHT

THE INITIAL STATE IS STATE "00".

THE FINAL(ACCEPTING)STATE IS STATE "05".


THE INPUTTED WORD IS AS FOLLOWS:

123


A TRACE OF THE PARSING PROCESS



THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@S|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@12C|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #   9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #   9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1SBC|
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@123|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@12C|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@12C|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@12C|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@12C|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123@1BC|
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā112CBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BBCC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 11
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 12
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 11
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBBCC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
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THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā111BCBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā111SBCBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 11
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 12
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 13
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 12
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11BCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā11SBCBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā1SBC|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā123|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  1
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|123ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE S6
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā#23|
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THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā#23|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||23ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE T6
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā##3|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā###|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 3
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā###|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 3
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā###|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 3
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā###|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 3
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3ā###|
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THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 3
THE STRING OF SYMBOLS ON THE TAPE IS:
|||3@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 06
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||||@###|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 04
WORD ACCEPTED
```

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EXAMPLE 3:  PARSING A CONTEXT FREE LANGUAGE.


THE SET OF PRODUCTIONS IS AS FOLLOWS:

S:1B
S:2A
A:1
A:1S
A:2AA
B:2
B:2S
B:1BB


THE SET OF TERMINALS IS AS FOLLOWS:

12


TURING MACHINE FORM OF THE LANGUAGE IS:

RULE #    IN STATE    SCANNING    NEXT STATE   PRINT       MOVE
                      SYMBOLS                   SYMBOLS

  1          00          S           00        1  B        NULL
  2          00          S           00        2  A        NULL
  3          00          A           00        1           NULL
  4          00          A           00        1  S        NULL
  5          00          A           00        2  A  A     NULL
  6          00          B           00        2           NULL
  7          00          B           00        2  S        NULL
  8          00          B           00        1  B  B     NULL
  9          00          1           00        1           RIGHT
 10          00          2           00        2           RIGHT
 11          00          |           01        |           LEFT
 12          00          @           03        @           RIGHT
 13          01          1           01        1           LEFT
 14          01          2           01        2           LEFT
 15          01          @           03        @           RIGHT
 16          03          1           1         #           LEFT
 17          03          2           2         #           LEFT
 18          03          #           03        #           RIGHT
 19          03          |           04        |           LEFT
 20          04          #           04        #           LEFT
 21          04          @           04        @           LEFT
 22          04          |           05        |           RIGHT
 23          1           1           1         1           LEFT
 24          1           2           1         2           LEFT
 25          2           1           2         1           LEFT
 26          2           2           2         2           LEFT
 27          1           |           S6        |           RIGHT
 28          2           |           T6        |           RIGHT
 29          1           #           1         #           LEFT
 30          2           #           2         #           LEFT
 31          1           @           1         @           LEFT
 32          2           @           2         @           LEFT
 33          S6          1           00        |           RIGHT
 34          T6          2           00        |           RIGHT

THE INITIAL STATE IS STATE "00".

THE FINAL(ACCEPTING)STATE IS STATE "05".


THE INPUTTED WORD IS AS FOLLOWS:
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12

A TRACE OF THE PARSING PROCESS


THE STRING OF SYMBOLS ON THE TAPE IS:
|12@2A|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@1B|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@S|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@2A|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22AA|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21S|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@2A|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@1B|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11BB|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12S|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@1B|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22AA|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21S|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
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THE STRING OF SYMBOLS ON THE TAPE IS:
|12@2A|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22AA|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22AA|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@222AAA|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@221SA|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@221A|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22A2AA|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22A1S|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22A1|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@22AA|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21S|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21S|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@212A|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@211B|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21S|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 01
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THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@21|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#1|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#1|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#1|
THE SYMBOL BEING SCANNED IS SYMBOL #   2
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#1|
THE SYMBOL BEING SCANNED IS SYMBOL #   1
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#1|
THE SYMBOL BEING SCANNED IS SYMBOL #   2
THE TURING MACHINE IS IN STATE T6
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11EB|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12S|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@1E|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11BB|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11EB|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@111EEB|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@112SB|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@112B|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11B1EB|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
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THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11E2S|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11B2|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@11EE|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12S|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12S|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@122A|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@121B|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12S|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@12|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   2
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   1
THE TURING MACHINE IS IN STATE 1
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THE STRING OF SYMBOLS ON THE TAPE IS:
|12@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   2
THE TURING MACHINE IS IN STATE S6
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@#2|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   2
THE TURING MACHINE IS IN STATE 2
THE STRING OF SYMBOLS ON THE TAPE IS:
||2@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE T6
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
|||@##|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE 04
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WORD ACCEPTED



EXAMPLE 4:  PARSING A REGULAR LANGUAGE.


THE SET OF PRODUCTIONS IS AS FOLLOWS:

S:0A
S:1B
A:0A
A:0S
A:1B
B:1B
B:1
B:0
S:0

THE SET OF TERMINALS IS AS FOLLOWS:

01

TURING MACHINE FORM OF THE LANGUAGE IS:

RULE #    IN STATE    SCANNING    NEXT STATE   PRINT        MOVE
                      SYMBOLS                   SYMBOLS

   1         00          S           00        0  A         NULL
   2         00          S           00        1  B         NULL
   3         00          A           00        0  A         NULL
   4         00          A           00        0  S         NULL
   5         00          A           00        1  B         NULL
   6         00          B           00        1  B         NULL
   7         00          B           00        1            NULL
   8         00          B           00        0            NULL
   9         00          S           00        0            NULL
  10         00          0           00        0            RIGHT
  11         00          1           00        1            RIGHT
  12         00          |           01        |            LEFT
  13         00          @           03        @            RIGHT
  14         01          0           01        0            LEFT
  15         01          1           01        1            LEFT
  16         01          @           03        @            RIGHT
  17         03          0           0         #            LEFT
  18         03          1           1         #            LEFT
  19         03          #           03        #            RIGHT
  20         03          |           04        |            LEFT
  21         04          #           04        #            LEFT
  22         04          @           04        @            LEFT
  23         04          |           05        |            RIGHT
  24         0           0           0         0            LEFT
  25         0           1           0         1            LEFT
  26         1           0           1         0            LEFT
  27         1           1           1         1            LEFT
  28         0           |           /6        |            RIGHT
  29         1           |           S6        |            RIGHT
  30         0           #           0         #            LEFT
  31         1           #           1         #            LEFT
  32         0           @           0         @            LEFT
  33         1           @           1         @            LEFT
  34         /6          0           00        |            RIGHT
  35         S6          1           00        |            RIGHT

THE INITIAL STATE IS STATE "00".
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THE FINAL(ACCEPTING)STATE IS STATE "05".

THE INPUTTED WORD IS AS FOLLOWS:
00110

A TRACE OF THE PARSING PROCESS


THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a0|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a1E|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a0A|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110aS|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a0|
THE SYMBOL BEING SCANNED IS SYMBOL #   9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a0|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a0|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a0|
THE SYMBOL BEING SCANNED IS SYMBOL #   8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a#|
THE SYMBOL BEING SCANNED IS SYMBOL #   7
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a#|
THE SYMBOL BEING SCANNED IS SYMBOL #   6
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a#|
THE SYMBOL BEING SCANNED IS SYMBOL #   5
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a#|
THE SYMBOL BEING SCANNED IS SYMBOL #   4
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a#|
THE SYMBOL BEING SCANNED IS SYMBOL #   3
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a#|
THE SYMBOL BEING SCANNED IS SYMBOL #   2
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110a#|
THE SYMBOL BEING SCANNED IS SYMBOL #   1
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THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE X6
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā1E|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā10|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā11|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā11B|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā1B|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā0A|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā01B|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
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THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā00S|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā00A|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā0A|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā0|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā0|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā0|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  1
THE TURING MACHINE IS IN STATE 0
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE /6
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110ā#|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
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THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110@#|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110@#|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110@#|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110@#|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110@#|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
||0110@#|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
THE TURING MACHINE IS IN STATE 04
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@10|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@11|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@11B|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@1B|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@10|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@10|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@10|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@10|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@10|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 01
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@10|
THE SYMBOL BEING SCANNED IS SYMBOL #  8
THE TURING MACHINE IS IN STATE 03
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@#0|
THE SYMBOL BEING SCANNED IS SYMBOL #  7
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@#0|
THE SYMBOL BEING SCANNED IS SYMBOL #  6
```

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THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#0|
THE SYMBOL BEING SCANNED IS SYMBOL #  5
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#0|
THE SYMBOL BEING SCANNED IS SYMBOL #  4
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  3
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  2
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  1
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  2
THE TURING MACHINE IS IN STATE S6
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā11|
THE SYMBOL BEING SCANNED IS SYMBOL #  9
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THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā11|
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  3
THE TURING MACHINE IS IN STATE 1
THE STRING OF SYMBOLS ON THE TAPE IS:
|00110ā#1|
THE SYMBOL BEING SCANNED IS SYMBOL #  2
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL #  9
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THE STRING OF SYMBOLS ON THE TAPE IS:
|00110@11B|
THE SYMBOL BEING SCANNED IS SYMBOL # 10
THE TURING MACHINE IS IN STATE 00
THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE STRING OF SYMBOLS ON THE TAPE IS:
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THE SYMBOL BEING SCANNED IS SYMBOL # 10
WORD REJECTED
50 STRINGS HAVE BEEN GENERATED
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Canonical Form
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

UNIPARSE: A Universal Parser, is a FORTRAN program implemented on an IBM 360/67. It is capable of parsing any finite, recursively enumerable language. The system simulates a Universal Turing Machine and utilizes bounded Breadth-First search and development techniques to evaluate Type 0 languages.

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